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INVENTOR : Clark, Robert

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VII. CLAIMS

What is claimed is:

- 1 1. A fluid irradiation apparatus for the modification of viruses and bacteria, comprising:
 - 2 a housing having an exterior side and an interior side, the interior side further defining
 - 3 an enclosure;
 - 4 an irradiation station affixed to the housing;
 - 5 a cuvette positioned across the irradiation station;
 - 6 at least two ultraviolet light sources positioned adjacent to the cuvette;
 - 7 means for drawing and transporting fluid through the cuvette;
 - 8 means for receiving the fluid transported and irradiated through the cuvette;
 - 9 means for enclosing the cuvette and irradiation station when the fluid irradiation
 - 10 apparatus is in use for minimizing the escape of ultraviolet light radiation; and
 - 11 means for energizing the fluid irradiation apparatus.

- 1 2. The fluid irradiation apparatus of Claim 1 wherein the cuvette is made of a quartz
2 crystal material.

- 1 3. The fluid irradiation apparatus of Claim 1 wherein the cuvette is made of a durable
2 plastic material.

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1 4. The fluid irradiation apparatus of Claim 1 wherein the at least two ultraviolet light
2 sources are, when in use, positioned on opposite sides of the cuvette.

1 5. The fluid irradiation apparatus of Claim 1 wherein one ultraviolet light source is
2 mounted in the enclosure and the other ultraviolet light source is mounted in a cover.

1 6. The fluid irradiation apparatus of Claim 1 wherein the at least two ultraviolet light
2 sources are calibrated in the UVA, UVB, or UVC light transmission band widths.

1 7. The fluid irradiation apparatus of Claim 6 wherein the at least two ultraviolet light
2 sources are calibrated between 40 and 400 nano meters.

1 8. The fluid irradiation apparatus of Claim 1 wherein the means for drawing and
2 transporting fluid through the cuvette is by a peristaltic pump.

1 9. The fluid irradiation apparatus of Claim 1 wherein the means for drawing and
2 transporting fluid through the cuvette is by an ivac bottle.

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1 10. The fluid irradiation apparatus of Claim 1 wherein the means for receiving the fluid
2 transported and irradiated through the cuvette is a bottle.

1 11. The fluid irradiation apparatus of Claim 5 wherein the means for enclosing the cuvette
2 and irradiation station when the fluid irradiation apparatus is in use is the cover.

1 12. The fluid irradiation apparatus of Claim 1 and further comprising an on/off power
2 switch, an on/off pump control switch, and an ultraviolet light control switch.

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- 1 13. A fluid irradiation apparatus for the modification of viruses and bacteria contained in
- 2 fluid, comprising:
- 3 a housing having an exterior side and an interior side, the exterior side further defining
- 4 an aperture and the interior side further defining a hollow center;
- 5 a cuvette positioned across substantially the surface area of the aperture and aligned
- 6 in a substantially parallel relationship with the housing;
- 7 a first ultraviolet light source located within the hollow center of the interior side of
- 8 the housing and positioned parallel to the cuvette;
- 9 a cover having an exterior side and an interior side, the interior side further defining
- 10 a chamber;
- 11 a second ultraviolet light source located within the chamber;
- 12 means for receiving the fluid transported through the cuvette;
- 13 means for transporting the fluid through the cuvette into the means for receiving the
- 14 fluid;
- 15 means for returning the fluid back through the cuvette from the means for receiving
- 16 the fluid;
- 17 whereby, the fluid transferred through the same cuvette is irradiated in at least two
- 18 separate instances by both the first and second ultraviolet light sources.

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1 14. The fluid irradiation apparatus of Claim 13 and further comprising a means for
2 drawing the fluid through the cuvette.

1 15. The fluid irradiation apparatus of Claim 13 and further comprising a means for
2 enclosing the cuvette when the fluid irradiation apparatus is in use.

1 16. The fluid irradiation apparatus of Claim 13 and further comprising a means for
2 controlling the operation of the fluid irradiation apparatus.

1 17. The fluid irradiation apparatus of Claim 13 and further comprising a faceplate that is
2 fitted within the aperture in the exterior side of the housing.

1 18. The fluid irradiation apparatus of Claim 13 wherein the further comprising a lens for
2 covering the second ultraviolet light source.

1 19. The fluid irradiation apparatus of Claim 13 wherein the second ultraviolet light source
2 is positioned, when in use, on the opposite side of the cuvette from the first ultraviolet light
3 source.

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- 1 20. A method for modifying viruses and bacteria from fluid in the body, comprising the
2 steps of:
- 3 (a) providing a fluid irradiation apparatus consisting of a housing and an
4 irradiation station in the housing;
- 5 (b) removing fluid from the body and depositing the fluid into a conduit;
- 6 (c) transporting the removed fluid from the body along the conduit and into a
7 cuvette;
- 8 (d) irradiating the removed fluid at the irradiation station within the cuvette by at
9 least two ultraviolet light sources;
- 10 (e) transporting the irradiated fluid from the cuvette along the conduit and
11 depositing the irradiated fluid into a container;
- 12 (f) removing the irradiated fluid from the container and depositing the fluid back
13 into the conduit;
- 14 (g) transporting the irradiated fluid back through the same conduit and back into
15 the same cuvette;
- 16 (h) irradiating the irradiated fluid within the cuvette by the at least two ultraviolet
17 light sources to produce a second irradiated fluid;
- 18 (i) transporting the second irradiated fluid back through the same conduit from
19 the cuvette;
- 20 (j) returning the second irradiated fluid into the body.

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1 21. The method of Claim 20 and the additional step of directing ultraviolet radiation from
2 the at least two ultraviolet light sources at the cuvette.

1 22. A method for modifying viruses and bacteria from fluid in the body, comprising the
2 steps of:

- 3 (a) transporting fluid through a conduit into a cuvette;
- 4 (b) providing a plurality of ultraviolet light sources at the cuvette;
- 5 (c) irradiating the fluid in the cuvette as it passes the plurality of ultraviolet light
- 6 sources to produce a first irradiated fluid;
- 7 (d) reversing the directional flow of the fluid to pass back through the same
- 8 cuvette; and
- 9 (e) irradiating the first irradiated fluid as it passes the plurality of ultraviolet light
- 10 sources a second time to produce a second irradiated fluid.